

10/050,454

F0604

REMARKS

Claims 1-20 are pending in the application. Claims 13-20 have been withdrawn from consideration due to a restriction requirement. The title has been amended to resolve an Examiner's objection. Favorable reconsideration in light of the remarks which follow is respectfully requested.

I. Objection to the Specification

The Examiner has objected to the title of the instant application for not being descriptive. Hence, the title has been amended to resolve the Examiner's objection. Accordingly, withdrawal of the objection is respectfully requested.

II. Rejection of Claims 1-12 Under 35 U.S.C. §103(a)

Claims 1-12 are rejected under 35 U.S.C. §103(a) as being unpatentable over Moslehi (US 5,270,222) in view of Ritzdorf *et al.* (US 6,508,920). It is respectfully submitted that this rejection be withdrawn for at least the following reasons.

To reject claims in an application under §103, an examiner must establish a *prima facie* case of obviousness. A *prima facie* case of obviousness is established by a showing of three basic criteria. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. See MPEP §706.02(j). The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. See *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

The present invention relates to a system for monitoring in-situ a seed layer deposition over a barrier layer throughout sidewall portions of a trench, the trench being

10/050,454

F0604

formed in a substrate. The system can measure thickness of the seed layer to ultimately determine seed layer uniformity over the sidewall portions of the trench and/or selectively correct the seed layer formation during the formation of the seed layer in part by taking measurements and comparing the measurements to those stored in a database. The measurements can also be compared to target measurements whereby the formation process conditions are selectively adjusted in order to obtain the target measurement.

The Examiner contends that Moslehi in view of Ritzdorf *et al.*, when combined, would have made the present invention obvious to one of ordinary skill in the art at the time the invention was made. Applicants respectfully disagree.

Moslehi relates to a sensor for providing diagnosis and prognosis of semiconductor fabrication processes including equipment parameters, dielectric film thickness, metal sheet resistance, film grain size, doping density, thickness uniformity, wafer temperature, plasma density, and the like (Moslehi Fig. 2). As acknowledged by the Examiner, Moslehi does not teach or suggest providing a sensor to measure seed layer formation and/or thickness of seed layer as it is being formed over a barrier layer and conformal to a trench.

However, the Examiner cites Ritzdorf *et al.* and contends that because Ritzdorf *et al.* apparently relates to seed layer formation and a controlling system 10 for controlling the parameter of the substrate, that it would have been obvious to one of ordinary skill in the art to perform the subject invention (Paper No. 5, pp. 3-4). The Examiner cites Ritzdorf *et al.*'s Figs. 1 and 2A-2G as support. Again, Applicants respectfully disagree.

Ritzdorf *et al.* is directed to a low-temperature annealing process to form copper-filled trench structures. Contrary to the Examiner's contention, Ritzdorf *et al.* does not teach or suggest a controlling system 10. Rather, Ritzdorf *et al.* includes a processing station 10 to carry out a plating process. Furthermore, Ritzdorf *et al.* fails to provide any motivation to be combined with the Moslehi sensor. That is, Ritzdorf *et al.* involves

10/050,454

F0604

forming copper metallization structures (by filling trenches) in part by employing a low-temperature anneal step. Ritzdorf *et al.* does not teach or suggest advantages or benefits of monitoring seed layer formation in-situ nor does it teach or suggest a system that monitors seed layer formation in-situ as claimed in the present invention.

The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. See *In re Vaack*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). Neither Moslehi nor Ritzdorf *et al.* provide a teaching, suggestion, and/or motivation to monitor seed layer formation as it is formed over a barrier layer in a trench. The purported obviousness conclusion based on the foregoing combination of references appears to be based on improper hindsight, in which the subject application provides the missing teaching or suggestion. See, e.g., *Monarch Knitting Machinery Corp. v. Sulzer Morat GmbH*, 45 USPQ2d 1977 (Fed. Cir. 1998).

Furthermore, the Federal Circuit has consistently held that

... 'virtually all [inventions] are combinations of old elements.' Therefore an examiner may often find every element of a claimed invention in the prior art. If identification of each claimed element in the prior art were sufficient to negate patentability, very few patents would ever issue. Furthermore, rejecting patents solely by finding prior art corollaries for the claimed elements would permit an examiner to use the claimed invention itself as a blueprint for piecing together elements in the prior art to defeat the patentability of the claimed invention. Such an approach would be 'an illogical and inappropriate process by which to determine patentability.'

In re Rouffet, 149 F.3d 1350, 1357, 47 U.S.P.Q.2d 1453 (Fed. Cir. 1998) (citations omitted).

Moreover, absent some teaching or suggestion in the prior art to combine elements, it is insufficient to establish obviousness by claiming that the separate elements of the invention existed in the prior art. *Arkie Lures Inc. v. Gene Larew Tackle*

10/050,454

F0604

Inc., 43 USPQ2d 1294, 1297 (Fed. Cir. 1997). It appears that the Examiner is simply isolating the separate elements from the cited art to make the purported combination against the instant invention. As noted above, the Federal Circuit has held this to be improper and insufficient to form a case of *prima facie* obviousness.

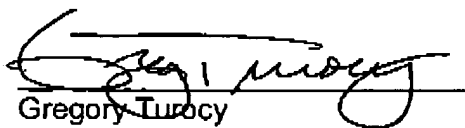
CONCLUSION

The application is believed to be in condition for allowance. A conclusion to that end is respectfully requested.

Should the Examiner believe that a telephone interview would be helpful to expedite favorable prosecution, the Examiner is invited to contact Applicants' undersigned attorney at the telephone number listed below.

In the event any fees are due in connection with the filing of this document, the Commissioner is authorized to charge those fees to our Deposit Account No. 50-1063.

Respectfully submitted,
AMIN & TUROCY, LLP


Gregory Turocy
Reg. No. 36,952

24th Floor, National City Center
1900 East 9th Street
Cleveland, Ohio 44114
(216) 696-8730
(216) 696-8731 Fax

FAX RECEIVED
JUN 18 2003
TECHNOLOGY CENTER 2800